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SEISMIC SAFETY

PLACENTIA

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ADOPTED BY CITY COUNCIL . . . . . .JULY 15, 1975

PLACENTIA

TABLE OF CONTENTS

PLACENTIA

PLACENTIA

LIST OF ILLUSTRATIONS

PART 1

SEISMIC SAFETY ELEMENT

PLACENTIA

INTRODUCTION

General Overview

The Seismic Safety Element, required by state law in 1971 as part of the general plans for all cities and counties in California (Government Code, Section 65302f) serves as the principal geotechnical component of land use planning. Although the basic objective of the document is to reduce loss of life, injury, damage to property, and economic and social dislocation resulting from future earthquakes, it also is concerned with slope stability problems (such as landslides and mudslides) and other soil-related hazards. Seismic hazards specifically to be identified and evaluated include susceptibility to surface rupturing from fault movement, ground shaking, related ground failure, and seismically induced waves (tsunamis or seiches). Additionally, in the present study, the soil-related characteristics of shrink-swell potential, erosion susceptibility, percolation capability, subsidence and hydrocompaction are evaluated in terms of their land use implication.

The Safety Element is concerned with fire prevention and control, and flood hazards as well as geotechnical hazards generally, including their identification, mapping and evaluation. The principal geologic hazards addressed in the Safety Element are

related to slope instability and soil problems and how they can be avoided or minimized in the planning process. However, the Seismic Safety Element document contains the basic geotechnical information used in the Safety Element. The Open Space and Conservation Elements have significant geotechnical inputs also, relating particularly to mineral and soil conservation, preservation of unique geologic features, mineral resource production, and possible open space designation for hazardous geologic conditions, if warranted.

STATEMENT OF GOALS AND PUBLIC POLICY - SEISMIC SAFETY AND SAFETY ELEMENTS

Goals

Goals of the Seismic Safety Element and Safety Element provide basic guidelines for city decisions as they affect land-use planning and development standards. The following are the chief goals:

* To protect life, property, and public well being from seismic and other geologic hazards.
* To reduce or avoid adverse social, economic, and environmental impacts caused by geologic conditions.
* To reduce the personal and social risks related to safety hazards, including fire.

Policy

The policies stated below provide a general direction and establish more specific steps for achieving the aforementioned goals through implementation and action program. The following are recommended policy statements:

* To maintain, revise (whenever necessary), and enforce existing standards and criteria to reduce or avoid all levels of seismic or other geologic risk, whether it be unacceptable, tolerated, or avoidable risk.

* To evaluate the compatibility of existing zoning as well as future land-use allocation, with known geologic risk zones, or those which may be identified in the future.

* To recognize the need to provide greater safety for important or critical-use structures (such as hospitals, schools, public assembly facilities, dams and utility corridors) through careful site selection, comprehensive site investigation appropriate for the situation, and enforcement of applicable codes and regulations.

* To prohibit development of important or critical-use structures in any active or potentially active fault zones, unless no other more suitable site can be located, and the site is shown to be safe for the intended use.

* To advocate improved seismic safety and fire programs for schools and promote greater general public awareness of all types of geotechnical and safety hazards.

* To improve interjurisdictional cooperation and communication, especially in regard to safety aspects related to dams, reservoirs, state highway and freeway structures, oil wells, regional fault studies, legislative matters, and disaster response or emergency plans.

* To advocate improved earthquake insurance programs and seek qualification of the city for Federal mudslide insurance.

Risk Definition and Risk Mitigation

In order to evaluate the adequacy of existing codes, regulations, or practices used to reduce or avoid seismic and other hazards, it is necessary to relate and define relative risk levels with specific hazards. The several types of risks discussed and

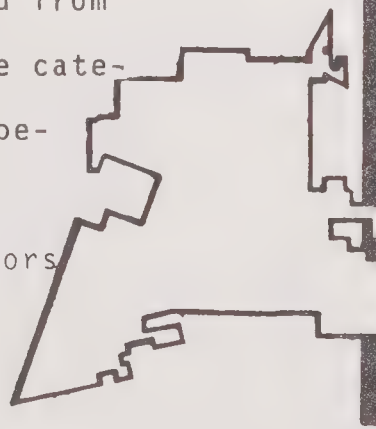
defined for the purposes of this report include acceptable, tolerated, avoidable, and unacceptable risk.

Unacceptable Risk: Hazards in this category include those which pose the most serious threat to life, property, or an existing structure, where no permitting or effective regulatory control exists to require abatement of the hazard. An example of such an unacceptable risk might be an old, earthquake-vulnerable hospital located on an active fault. Alternately, a well-constructed one-story wood frame residence located in an active fault zone, but not on a fault trace, would be a less severe risk and also categorized as unacceptable, or perhaps tolerated, depending on the dictates of public safety.

In the case of the most severe slope stability problems, a prime example of an unacceptable risk might be an impending landslide about to bury an existing house or other habitable structure for which there is no regulatory control to prohibit its occupancy. It is noted that such hazards are in a large degree avoidable risks which can and should be mitigated in the planning or construction stages of development, either by prohibiting construction within the slide (or fault zone) or eliminating the risk by corrective grading or other feasible stabilization measures.

Tolerated and Acceptable Risk: Between the extremes of the risk scale, unacceptable at one end and acceptable at the other, there are all degrees of relative risk. These are less clear-cut situations (such as a suspected slide or potentially active fault) which may or could pose a threat to existing features or improvements. A similar situation is the possible hazard of a slide-prone formation which underlies a site. Although these may be equally unacceptable risks, such factors as the probability of occurrence at a site and the importance or value of a structure or land-use result in gradation in the degree of risk unacceptability. Also, further toward the acceptable risk end of the scale are other presently unrecognized hazards either because of lack of information or capability to detect the hazard. Although there appears to be no consensus for the definition of acceptable risk (for the purposes of categorizing the various geotechnical hazards in land-use planning), those considered most unacceptable can be identified and mitigated, if possible, or restricted from future use. Those remaining risks, therefore, are placed in the category of tolerated or acceptable risk, with no rigid distinction between the two having been specifically defined.

Criteria for Decision-Making Related to Risk. The following factors are considered in evaluating risk:



1. Severity of potential loses: Hazards including loss of life, injury, property damage, loss of function, and hidden cost should be considered.

2. Risk reduction capabilities: Consideration should be given to current technological capabilities, available fiscal and manpower resources, and established priorities.

3. Probability of loss: The probability of future seismic or other adverse geologic occurrences should be evaluated in light of their possible effect on structures or human activities.

4. Adequacy of basic data: This is an important factor in estimating the probability of imperceived hazards.

For the most part, there must be reliance upon only very general, qualitative appraisals of these factors, considering the scope of the present study. It is possible, however, in specific instances, to establish a reasonably based benefit-cost analysis which can immeasurably enhance the accuracy of decision-making process.

REPORT SUMMARY AND GENERAL CONCLUSIONS

General Statement of Geotechnical Conditions

The majority of the City is relatively free of serious or significant Seismic, geologic or soil engineering problems. Levels of seismic (earthquake) shaking are expected to be generally moderate, primarily influenced by the major active faults of the region: the San Andreas, San Jacinto, San Fernando-Sierra Madre, and Newport-Inglewood fault zones. Ratings of seismic and geologic hazards within the city are summarized as follows:

Seismic (earthquake) shaking	-	Generally moderate; possible localized intensity amplification effects.
Fault rupture potential	-	Low in most areas; potentially moderate in areas of projected trace of Norwalk fault and in anticlinal areas.
Liquefaction potential	-	Low
Slope instability	-	Low
Expansive soil potential	-	Low to locally high.
Settlement hazards	-	Generally not significant, but potentially locally high.
Other related seismic and geologic hazards	-	Low

No significant negative social impact on the general community is expected from implementation of the Seismic Safety Element, or its related elements. The combination of low hazard ratings, the limited number of substandard buildings, and lack of important structures located across major faults should render a comprehensive building survey and abatement program unnecessary. Some areas of limited potential slope instability may be present within the low hills near the northeast boundary and in the middle southeast portion of the City. Appropriate application of, and strict adherence to, grading ordinances and development regulations in these areas, particularly, will be sufficient to avoid future problems.

No special seismic design requirements other than those in the proposed 1973 Uniform Building Code are expected to be necessary for most types of construction. However, emphasis should be placed on implementation of well-defined grading and development regulations tailored to the City's particular needs, especially in the expansive soil zones and the few hillside areas.

Regional Seismicity

Our analysis of the regional seismicity indicates that ground shaking of generally moderate intensity from any of four major active fault zones may be expected within the City. The probable seismic shaking characteristics, summarized in Tables 3 and 4, can serve as a guide for City engineering personnel (or other reviewing agency).

in evaluating future detailed studies of specific sites. These seismic parameters relate to the maximum probable earthquake originating on any one of the principal faults, each having recurrence intervals on the order of 50 to 200 years.

Faults

Although the Whittier Fault forms the northerly extension of the Elsinore Fault (a major active zone), the potential for a damaging earthquake, with or without surface rupture, originating on the nearby Whittier Fault is considered moderate to low for any given 50 to 100 year period. Nevertheless, it is considered a potentially active fault requiring appropriate construction setbacks from its surface trace. Since the fault is at least 1000 feet north of the City, it is not expected to have any direct impact on land use or construction within the City.

Other nearby significant faults include numerous, relatively short, unnamed faults within the adjoining West Coyote, East Coyote and Richfield Oil Fields, and the Norwalk Fault. The exact extent of the latter fault is in question, some researchers indicating its presence in the southwest or the northern portion of the City, as indicated in the accompanying Figure 1 and in Plate I. This fault demonstrates recent displacement of material possibly as young as 10,000 years

or suspected earthquake activity in the northwest portion of its trace, however, it is considered potentially active for the purposes of this report.

It is noted that some investigators place the Norwalk Fault in the active category, since the evidence for movement occurs in material dated 10,000 years (Before Present). Since no additional evidence of movement is known, and no seismic events have been recorded specifically along the trace, the fault is in actuality a borderline case. We have chosen the former classification to inform the City of the potential hazard, while at the same time basing our classification on the best interpretation of the facts as presently available.

The minor faults associated with the local oil fields do not appear to have disturbed Holocene or Pleistocene sediments and therefore are placed in the inactive category. These secondary faults may have potential significance, however, as discussed in the Seismic Analysis section of this report.

Landslides, Mudflows, and Related Slope Stability Problems

Any potential slope stability problems are limited essentially to the hillside terrain to the northeast of Valencia Avenue and Bastanchury Road and to the southeast of Linda Vista Avenue.

We understand that the few slope failures which have affected developed areas have been corrected in accordance with the recommendations of private consultants. Should ancient slides and/or potentially adverse geologic structure such as unfavorably oriented bedding planes be encountered in future work, such conditions will require appropriate planning to avoid these areas, or adequate allowances for slope stabilization work prior to construction.

Mudflows, slumps or other shallow slope failures, for the most part, have not been a significant problem in most areas of the City. The only potential areas for such problems in the future would appear to be within the steeper hillside terrains of the middle southeast during periods of abnormal precipitation, or should development of this area become feasible in the future.

Liquefaction, Lurching, and Differential Compaction

These seismically related forms of ground failure or distress are not believed to be significant hazards, considering the anticipated levels of seismic shaking and the character of the underlying soil and groundwater conditions. Sites of important structures in areas where detailed investigation indicates they may develop, however, should be evaluated for such hazards, on an individual basis.

SEISMIC INDEX MAP OF LOS ANGELES BASIN

FIGURE 1

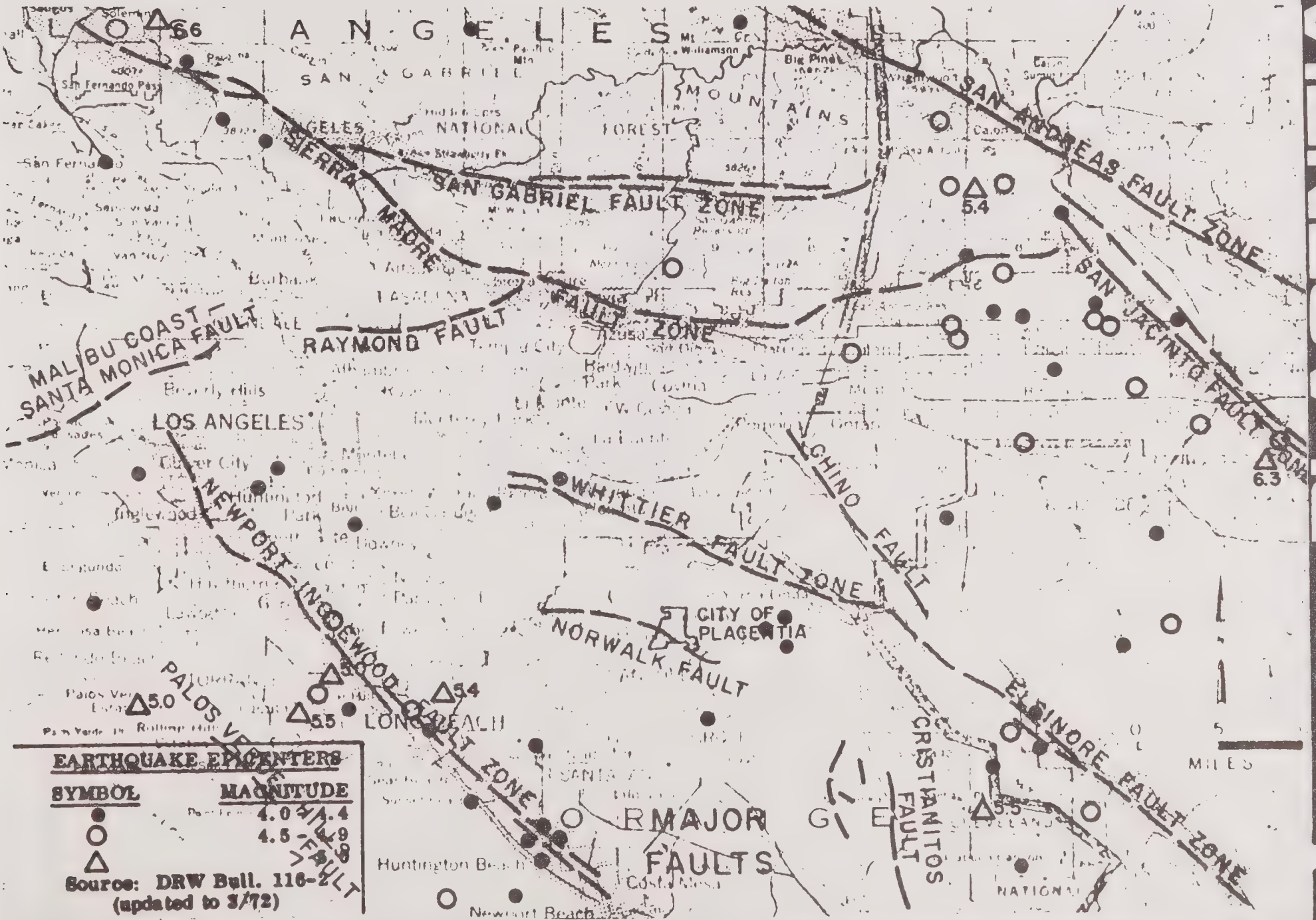


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FIGURE 2

GEOLOGIC TIME SCALE SHOWING FAULT CLASSIFICATIONS

RELATIVE GEOLOGIC TIME			ATOMIC TIME (In millions of years)
Era	Period	Epoch	
CENOZOIC	QUATERNARY	Holocene	— .011 —
		Pleistocene	— 2-3 —
	TERTIARY	Pliocene	— 12 —
		Miocene	— 26 —
		Oligocene	— 37-38 —
		Eocene	— 53-54 —
		Paleocene	— 65 —
MESOZOIC	CRETACEOUS	Late Early	— 136 —
	JURASSIC	Late Middle Early	-190-195—
	TRIASSIC	Late Middle Early	— 225 —
PALEOZOIC	PERMIAN	Late Early	— 280 —
	CARBONIFEROUS SYSTEMS — PENNSYLVANIAN	Late Middle Early	
	CARBONIFEROUS SYSTEMS — MISSISSIPPIAN	Late Early	— 345 —
	DEVONIAN	Late Middle Early	— 395 —
	SILURIAN	Late Middle Early	430-440—
	ORDOVICIAN	Late Middle Early	— 500 —
	CAMBRIAN	Late Middle Early	— 570 —
PRECAMBRIAN			- 3,600+-

ACTIVE FAULTS*

POTENTIALLY ACTIVE FAULTS

INACTIVE FAULTS

*As defined by policies & criteria of State Mining & Geology Board

PLACENTIA

Tsunamis and Seiches

Neither of these seismically related hazards exist within the City. Design of water-storage structures (such as reservoirs and tanks), however, should require design analysis for possible seiche loading caused by earthquake shaking. We further understand that the one existing water tank is scheduled for removal in the immediate future, and will not be replaced. If this structure is to be retained, it will pose a potential hazard in the event of major seismic activity in the area.

Groundwater, Surface Runoff and Attendant Problems

Groundwater levels in the La Habra-Yorba Linda Basin are generally deeper than 25 feet and presently pose no significant problems from a land-use planning viewpoint.

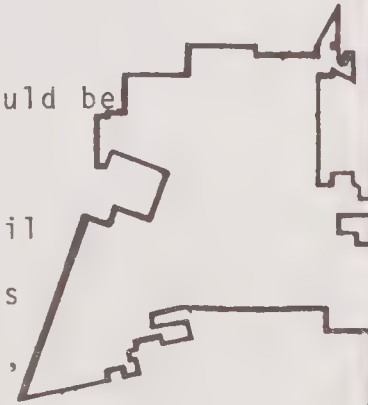
Surface runoff and its attendant problems of erosion, sedimentation and soil creep in hillside areas will continue to be a local problem in years of heavy rainfall as demonstrated by the rains of December, 1974. Although present flood control improvements and natural drainage courses have adequately handled most peak flows, the effect of any future developments on their carrying capacity should be carefully evaluated. Up grading of present improvements and installation of special surface or shallow subsurface drainage devices may be

needed in the future, particularly in the southern portion of the City adjacent to the Santa Ana River floodplain.

Subsidence, Settlement and Expansive Soils

Regional land subsidence resulting from the withdrawal of subsurface fluids is not known to significantly affect the city. Judging from present and probable future ground water needs, subsidence due to overdraft of the groundwater resources appears unlikely assuming that recharging of the aquifer is continued. Minor but measurable subsidence as well as uplift have occurred in the area of the Coyote Hills Oil Fields during the period from 1951 to 1970. Continued monitoring of possible future subsidence or uplift in this area through city, county, or other agency cooperation should be maintained. Subsidence and settlement hazards may deserve more detailed analysis should development of the Richfield oil property eventually be undertaken.

Settlement of structures due to consolidation of the subsoils could be a localized future problem, as in any large area of diverse soil condtitions. With appropriate city requirements for adequate soil engineering investigations, however, such potential problem areas can be recognized and allowed for in the design stage. Likewise, the presence of expansive soils appears to pose no significant



development constraint or land-use planning impact so long as adequate pre-development and designs are utilized.

Land-Use Capability Map (Microzonation Map)

Geotechnical hazards are displayed on the Land-Use Capability Map (Plate II) and also referenced in the Safety Element. This map is an interpretive map designed to facilitate land-use planning by rating the various geologic hazards which, in turn, relate to land suitability or capability. The delineated map areas are rated generally in their order of increasing relative risk, because of type and severity of geologic hazard (either existing or potential), inherent soil sensitivity (to seismic shock) or expansive soil conditions. Those zones rated high in risk potential are dependent on other factors in this instance. Zone 3.1, for example, is potentially hazardous due to the presence of the water tank and the possible expansive soil condition. The scheduled removal of the water tank will reduce this area to a level 2. Similar conditions apply to Zone 3.2 (applicable primarily in the case of future development), and zones 3.3 and 4 (dependent on future accurate delineation of the Norwalk fault traces in those locations).

Seismic Safety Element and Its Relationship to Other General Plan Elements

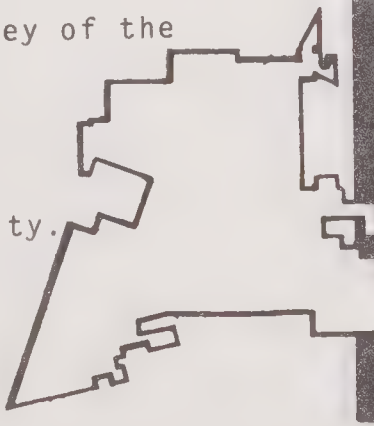
Although particular emphasis has been placed on the Seismic Safety and Safety Elements in our investigation, the geotechnical findings also relate to the Conservation Element and the Open Space Element (collectively called the Environmental Management Plan) as well as to the Land-Use Element; these are in accordance with the latest (September 1973) state guidelines for local general plans.

Impact Assessment

1. No geotechnical hazard has been identified as an unacceptable risk within the City of Placentia on the basis of present knowledge concerning the study area. The questionable positions and extensions of the Norwalk fault shown on Plate I of the Background Data & Geotechnical Information Volume are not at this time considered sufficiently well defined to fall into this category. It is presently considered a tolerable risk. City personnel are, however, advised to maintain cognizance of future definition of the geologic structure of this area. The potential for surface rupture in these zones will be increased to the unacceptable level, should the tentative positions indicated be confirmed. For this reason, the most likely trace of the fault has been shown on

Plate II as an unacceptable risk.

2. The potential hazard of strong ground motion, due to seismic events along the adjacent potentially active fault zones, may be considered in the acceptable category given the mitigating construction techniques available and the numerous advantages offered by the area as a unique living environment.
3. The other potential geotechnical hazards present in the area are considered to fall into the tolerable, avoidable or acceptable risk categories including the potential hazards posed by the expansive soils and the limited threats of liquefaction, hydrocompaction and settlement hazards.
4. A comprehensive building survey and hazardous-building abatement program, in view of the apparent absence of substandard, earthquake-sensitive buildings within the study area, is considered unnecessary. However, consideration should be given to a specific survey of the marginal buildings located on West Santa Fe Street.
5. No substantive changes are believed necessary in the present building codes or development regulations for the city. They should be periodically reviewed and revised, if necessary, to reflect the current state-of-the-art and the latest geotechnical data.



6. No dams or reservoirs were identified as seismically or geotechnically unsafe. Routine monitoring of these facilities for leakage is advisable, however, on a periodic basis, particularly after earthquakes. The one water tank in the area along Chapman Avenue is considered a potential hazard under seismic conditions. Since it is scheduled for removal in the near future, no action is required at this time.

7. No significant negative social, ecologic, or economic impact on the general community is expected from the implementation of the seismic safety, safety or other related elements with geotechnical inputs. In the long-term, they should have very positive impacts.

IMPLEMENTATION PROGRAMS

The implementation aspects of any plan are as vital to accomplishing the primary aims as are the identification of hazards and the statement of policies. Following is a general list of existing programs, guidelines, and an integrated set of recommendations applicable to Placentia. Considered together, they may have application and provide strategy options in relation to major land-use concerns. In addition, they may have specific land-use planning and development control implications.

Existing Programs

The following programs have actual or potential application to the problems identified in this element:

City

Zoning, Building and Grading Regulations
Placentia Redevelopment Plans (Per Annual Report 73-74)

County

Orange County Seismic and Safety Element (in progress)
Zoning and Building Regulations
Cooperative Mapping Program with California Division of Mines and Geology and U.S. Geological Survey

State

Dam Innundation Areas, Mapping and Evacuation Plans
Dam Safety Inspection
Active Fault Mapping (Alquist-Priolo Hazards Zone Act)

State (Continued)

General Geologic Mapping
School Safety
General Geologic Mapping

Federal and Other

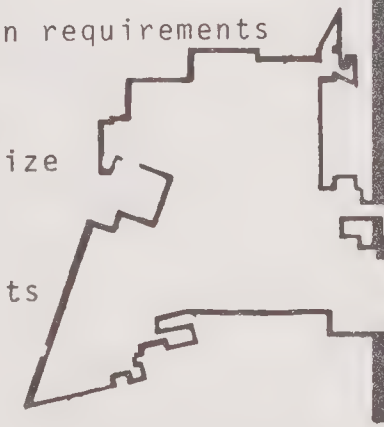
U.S. Geological Survey Mapping and Earthquake Research and Monitoring
Department of Housing and Urban Development - Urban Planning Research Funding
University Research on Geologic Hazards

Hazard Reduction Strategies

Methods of mitigating geologic hazards most often employed fall into three basic categories as follows:

Hazard Abatement: This is the most positive means of hazard reduction, but it is also the most controversial since it primarily involves the elimination of an existing hazard, usually at a substantial cost to the owner. Demolition of an old, earthquake-vulnerable building is an example. It can also have significant negative social impact related to possible relocation requirements necessary to the hazard reduction process.

Impact Reduction: This strategy addresses measures to minimize the adverse effects of future earthquakes and geologic events on existing and future developments. It can involve reactive efforts such as emergency or contingency plans after a disaster, or up-grading of standards to minimize the possible adverse effects



of a geologic event.

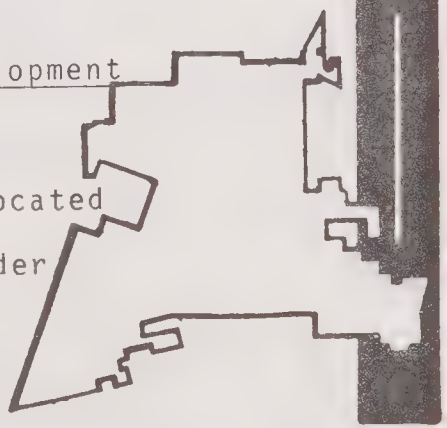
Hazard Avoidance: Most important at the land-use planning level is the strategy of avoidance. With the advanced knowledge of the various types and severity of hazard within a planning area, those land uses most compatible with the risk can be matched, thereby avoiding unacceptable risk areas or limiting them to the least important land uses.

Setting Priorities: The following criteria should be used to establish priorities so that judgments can be made regarding allocation of limited funds to the most critical areas or problems:

1. Significant and impending threats to human life or safety;
2. Potential for widespread social disruption;
3. Unacceptable levels of potential economic loss;
4. Significant threats to future population or development;
5. Problems which are not likely to result in adverse impacts.

Problems and Issues: Protection of Existing Population and Development

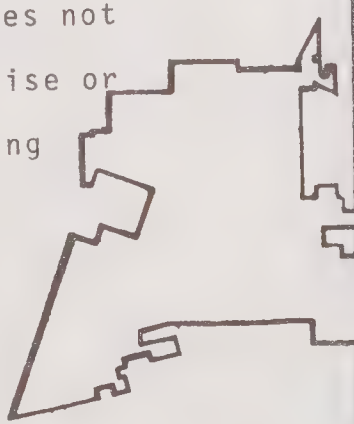
1. Earthquake Hazardous Old Buildings: Only one hazardous older building has been identified in the City and is located at 229, 231 West Santa Fe Street. Inspection of the older buildings along West Santa Fe Street is recommended. However, an overall progam of concern is not considered necessary at this time. Any codes (e.g., building, electrical



plumbing, etc.), however, should also be cognizant of possible structural deficiencies related to seismic resistance, so that such buildings can be identified for additional evaluation.

2. Existing Structures or Improvements Within Fault Zones Tentatively Classified potentially Active: Because the probability of fault activity is presently believed to be very low (no active fault zones occur within the City boundaries), no abatement measures are considered necessary. All property owners within the City, however, should be made aware of the potential hazard posed by the trace of the Norwalk Fault that may underlie the City, and, such zones which lie adjacent to the area and the implications thereof.

3. Medium and High-Rise Structures: Particular seismic problems related to the safety of medium rise (4 to 6 stories) and high rise (7 or more stories) buildings involve emergency response difficulties; namely, evacuation procedures and fire control. This does not appear to be a major problem since there are no medium-rise or high-rise buildings in the City. Nevertheless, the zoning code allows the construction of medium-rise buildings; therefore, the seismic response procedures required will need to be taken into account. No special seismic concerns related to low-rise buildings (1 to 3 stories) have been recognized.



4. Dam, Reservoir, and Water Tank Safety: The one existing water tank near Chapman Avenue is a potential hazared in the case of ground motion resulting from a major seismic event along adjacent fault zones. It is, however, scheduled for removal in the immediate future. None of the other facilities in this category within the study area have been identified as seismically unsafe or a significant hazard to adjoining areas. It is noted that although not within the study area, the adequacy of the capacity of Fullerton Dam is in question and that neighboring communities are participating in a study of existing flood control measures. Cooperation and communication with the agencies involved with these facilities and investigation, however, is recommended so that their current status can be monitored.

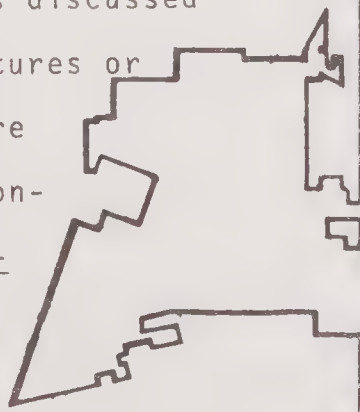
5. Vital Facilities: These include fire control, law enforcement, hospitals, and communication centers which must remain operational following a major earthquake. No buildings of this category are affected. Since no high risk zones were identified in the study area and since individual sites or facilities were not specifically evaluated for the present study, further investigation regarding their compliance with current structural standards for aseismic design should

be considered to verify their apparent safety.

6. Schools: The 1933 Field Act established minimum earthquake safety standards for school construction. Legislation passed in 1968, and recently modified, prohibits the use of seismically hazardous school facilities after 1977. It is our understanding that all of the public schools within the study area comply with the Field Act. The school sites in the northwest of the city lie in expansive soil zones. Any proposal for new construction at these sites may require special investigation of the soil hazard.

Problems and Issues: Management of Future Development

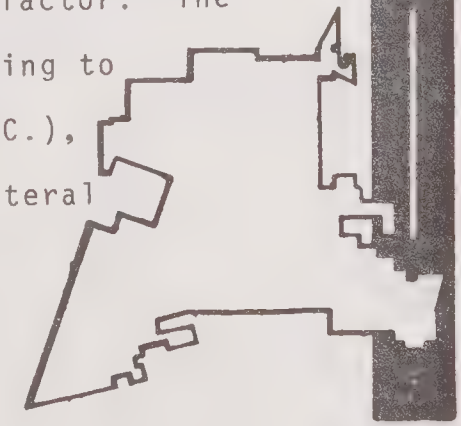
1. Seismic Design considerations - All Construction: Conformance with the 1973 Uniform Building Code is considered adequate for most ordinary types of construction utilizing the seismic parameters given in Table 4. At the discretion of the Building Official, certain of the more important or critical use structures (as discussed above) such as hospitals, schools, high-occupancy structures or public assembly facilities, high-rise buildings, and fire stations, etc., should be specified as requiring more conservative seismic design parameters, utilizing the maximum credible earthquake (rather than the maximum probable earthquake). Other, less important uses such as certain utilities, roads, and small isolated dams



could be designed utilizing the maximum probable earthquake, as ordinary types of construction.

Determination of the seismic design parameters for the maximum credible earthquake will require independently derived data based on specific site conditions and the type of construction proposed. A design response spectrum or criteria set forth in the Uniform Building Code (as supplemented by the April 1974 recommended revisions) should be required as a basis for aseismic design. The latest U.B.C. criteria provide for importance factors (for various building types) to be applied in the design. Inclusion of these factors should be required if the U.B.C. is utilized for design.

In certain cases, based on specific site data, it may be appropriate for the Building Official to consider allowance for local variations in site conditions by permitting adjustment of the "Z" factor. The "Z" factor, which is a numerical coefficient corresponding to the seismic zone (1, 2, or 3, as delineated in the U.B.C.), is part of the formula determining the minimum total lateral seismic force for design of structures. Placentia, as well as the remainder of California, is within Zone 3, representing the highest seismic risk nationally. Because the seismic setting of the Placentia area is

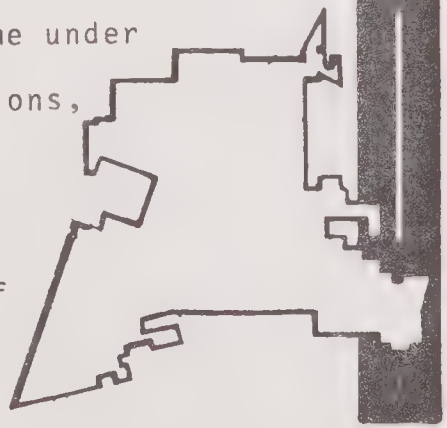


significantly more favorable than some other seismically active areas in Zone 3, a reduction of the coefficient (below the 1.0 required in Zone 3) is probably justified. Additional detailed geologic, seismologic, and structural engineering studies of the feasibility of permitting code variances for local seismic conditions, however, will be necessary. This would require regional studies correlating the differences in seismic conditions within the zone, and as compared with a particular site being investigated.

2. Adequacy of Existing Building, Grading, and Development Regulations: The existing regulations governing future construction and development are considered adequate for the mitigation of the anticipated geologic hazards. One seismic consideration possibly deserving further analysis is in regard to the safety factor required for design of buttress fills (Sec. 7-3.22d of the Grading Ordinance). Current state-of-the-art practice (observed by some Southern California governing agencies) requires that the seismic forces be included in stability analyses, which permit safety factors less than 1.50, but generally greater than 1.10. Considering the presently known seismic and geologic setting of the study area, it is recommended that further study of this aspect be made before instituting a code change.

3. Geotechnical Investigation Standards: The table on Plate II of this document is intended to serve as a guide for the City Engineer or Building Official in determining the type and scope of investigation to be required prior to the issuance of permits. The table facilitates identification of specific concerns or hazards which may require particular attention in the investigation. Suggested guidelines for geologic/seismic investigations and reports are contained in various local governing agency regulations and professional society publications (e.g., Association of Engineering Geologists).

4. Liquefaction and Fault Rupture Hazards: Based on present data, specific analyses of the liquefaction hazard do not appear warranted unless ground water levels rise or those areas of surface water rise during periods of abnormal precipitation. As yet, the major fault tentatively classified as potentially active does not come under the jurisdiction of the state Alquist-Priolo Act provisions, which determine investigation standards and setback requirements should the position and extension of the Norwalk fault become well defined. At the discretion of the Building Official, all development (or only certain of the more important land-uses) within the tentatively



classified potentially active Norwalk fault zone may be required to comply with the state requirements for the evaluation of the fault rupture hazard. The state criteria prohibit construction of habitable structures across such a potentially active fault (or multiple fault lines within the zone) and require a minimum set-back of 50 feet from such a fault, unless specifically approved by a registered geologist.

Future studies of the regional fault hazard by various governmental agencies or private consultants may require revision of the delineated special study zone (either enlarging, reducing, or eliminating).

PART 2

SAFETY ELEMENT

PLACENTIA

INTRODUCTION

General Overview

The primary purpose of the Safety Element is to insure that safety considerations are incorporated in the planning process to reduce personal, social, and economic losses resulting from hazardous occurrences within the locality. The present document, therefore, defines potential hazards present in the Placentia area, establishes goals for hazard reduction, provides guidelines for establishing the level of risk acceptable to the inhabitants of Placentia and incorporates information pertinent to the reduction of safety hazards in new and existing structures. The document, in conjunction with the foregoing Seismic Safety Element, also addresses itself to the establishment of priorities for the lessening of safety hazards, considering the variable frequency and occurrence of hazardous events. Additionally, information from the Seismic Safety Element, Circulation Element, and fire control data is utilized in determining general criteria for land use in the city.

The Concept of Risks

In determining the hazardous and/or potentially hazardous zones present within the City of Placentia, the definition of the types of risks applicable in given situations were those defined in the Seismic Safety Element (Page 1-11).

It is also necessary to consider the concept of priority in relation to risk assignment. The highest priority is assigned to risks affecting the life and limb of individuals or groups of individuals. Two secondary risks are also to be considered, although some disagreement exists over their respective priority levels. They include the risk of social disruption and the risk of property loss. Within western civilizations, the tendency has been to assign the risk of property loss a second level priority due to the economic considerations involved. The risk of social disruption under this premise is then considered at the tertiary level.

Recent advancements in the understanding of the social behavior and motivation of groups within western culture is serving to modify the above order. Hence, it is now realized that the effects of social disruption have a potential for producing consequences which greatly overshadow the effects of economic loss or contribute measurably to such loss. Consequently, at the minimum, these latter risks should probably be considered of equal priority; in some instances the risk of social disruption will be of greater importance than the risk of property loss.

Safety Standards

Safety standards and criteria are rules established for use as a basis for comparison in measuring unacceptable levels of risk.

The responsibility for establishing criteria and standards rests primarily with local jurisdictions. The state has established some standards but has left the city and other local agencies the task of enforcing them.

Standards: Although there is no single unified set of safety standards, the City of Placentia has evolved a series of standards, specifications, and regulations that apply to safety. These are incorporated into various codes and ordinances; the primary ones applicable to the scope of this element being the Building Code, Fire Code, Grading Ordinance, Zoning Ordinance, Subdivision Ordinance, and State Health and Safety Code.

The Building and Fire Codes contain building standards. Land development standards are in the Grading, Zoning, and Subdivision Ordinance as well as the Fire Code.

Building standards were designed to establish common safeguards for erection of buildings, the structural condition of existing structures, and their level of general maintenance.

Land development regulations are the principal devices by which the City of Placentia can guide urban development into appropriate areas and influence its form and arrangement.

Criteria for evaluating risk are discussed in the Seismic Safety Element (Page 1-12).

Relationship to Other Elements

The Safety Element involves considerations which will have a secondary impact on other elements of the general plan including the Land Use, Circulation, Open Space and Conservation Elements. The element most directly related to the present document, however, is the Seismic Safety Element, since the geologic hazards present in an area determine to a large degree the risk level that is applicable. Consequently the joint publication of these two documents contributes to the increased importance of both.

The Safety Element, particularly when considered with the Seismic Safety Element should have an overall impact in reducing social and economic losses as well as in reducing adverse environmental impacts.

Implementation

The compilation of the Safety Element is the initial step in accomplishing the integration of the necessary inputs into the planning program of Placentia. This document provides the necessary information to allow revision of other general plan elements if required. The information provided herein also allows the establishment of criteria for the review and modification, if

necessary, of zoning, subdivisions and site development regulations. Inspection programs to identify fire and other safety hazards may be instigated. Finally, disaster plans and the efforts of the local fire and police departments may be reviewed to insure compatibility with safety objectives.

The second step in the ultimate implementation of the Safety Element is the judgment rendered by the general public concerning the establishment of "acceptable risk". Thus, integration of the public desires, based on their access to the information contained herein, coupled with the actions of the concerned governmental agencies, can lead to an overall acceptable and operational safety plan for the city.

SAFETY CONSIDERATIONS

Fire

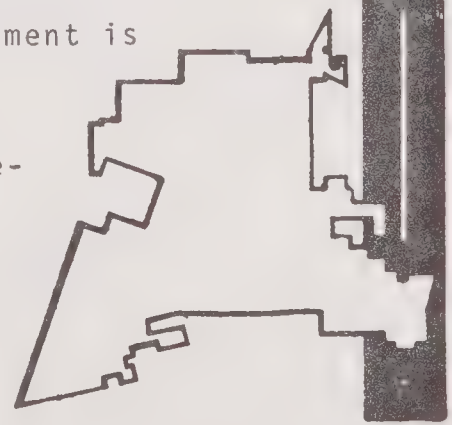
The majority of fires in the Placentia area are related to human activity. Natural fires caused by lightning or other non-human phenomena are extremely infrequent and represent little threat to the safety of the community.

Residential Areas: Approximately 70% of the City, at its ultimate development will be single-family homes. As of January 1975, 43% of the total City was developed in single-family homes. Most of this development is relatively new and does not present any imminent fire hazard; however, conflagration is possible due to the combination of wood shingle roofs with occasional Santana winds.

Commercial Areas: Approximately 6% of the City at its ultimate development, will be in commercial office or retail commercial. Most of the existing commercial office and retail commercial have been built within the last 10 to 15 years and are in a good state of repair. However, parts of the Santa Fe area, in the original town site, are in a deteriorated condition and do represent a safety hazard. The City is presently initiating a program of abatement of those buildings beyond repair and an active program of Fire prevention.

Placentia has one major hospital (within the City limits) to serve the community, Placentia-Linda Hospital. The activities and populations associated with these facilities are particularly sensitive to fire hazards. General hospitals, offering a wide array of medical services, rely on highly sophisticated and sensitive equipment for a number of life maintenance functions. Fire damage to such equipment would directly affect the safety and well being of present and future patient populations. The hospital is protected by a sprinkler system and early warning fire detection devices.

Industrial Areas: Approximately 15% of the City, at its ultimate development, will be in light and heavy industrial development. At this time, the Pargas Facility represents the most potentially hazardous industrial facility in the City, due to its storage of liquid petroleum gas. However, more than adequate fire prevention controls are in effect at this facility. In addition to reviewing all new industrial development, the Fire Department is controlling the storage of flammables and/or toxic materials in warehouses. Fire sprinkler systems, required at the time of development, have proven to be 99% effective in controlling fires in these facilities. The use of fire sprinkler systems is being actively encouraged.



Undeveloped Areas: The natural area, vegetation, etc., could represent a relatively hazardous problem; however, the Placentia Weed Abatement Program controls most of the problem areas. Without the Weed Abatement Program, high winds and Santana conditions could compound the fire hazard. In the undeveloped areas of the City, there are a number of oil wells. These wells represent a potentially hazardous situation; however, historically, they have not presented a fire problem to the City. Even though the Fire Department has not experienced a major conflagration in the oil fields, they do have plans for dealing with oil fires. In addition, the County-wide Mutual Aid Program could be implemented in the event of a major oil fire by making the County's fire fighting equipment available to the City.

Other: Transportation of flammable liquids through the City, gasoline delivery at service stations, and heavy equipment hauling flammable liquids on the freeways, represent a potentially hazardous situation. The U.S. Department of Transportation has jurisdiction over transportation on highways and rail.

Fire Insurance Classification

The fire insurance system, as it applies to this report, should be considered as a guideline to point out areas of continuing vigilance. The City was graded in 1966 and was designated a

Class 5; the water system was also graded and designated as Class 4. The following categories used by the Insurance Services Office to classify cities are discussed as they apply to Placentia.

A. Water Supply
B. Fire Department
C. Fire Service Communications
D. Fire Safety Control

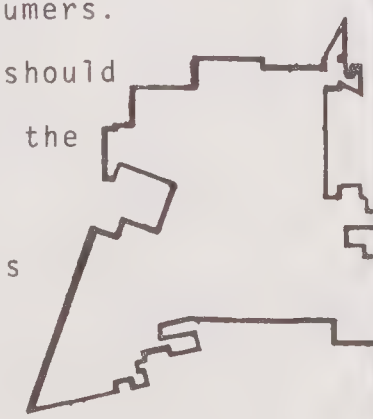
A. Water Supply Systems: The City of Placentia is served by two water systems; (1) Southern California Water Company and (2) Yorba Linda County Water District. The Southern California Water Company has three wells located in the City of Placentia capable of supplying approximately 2,000 GPM. There are three storage facilities in the City (1) elevated tank with holding capacity of 50,000 gallons, (2) submerged tank at Diamond and Ruby with a holding capacity of 200,000 gallons, and (3) submerged tank at Golden and Kraemer, with a holding capacity of 1,500,000 gallons. The Yorba Linda County Water District does not have storage facilities in the City of Placentia.

Water Storage: According to the Fire Protection Engineers of the Insurance Services Office, water storage should be sufficient during any period of five days maximum consumption to provide domestic and industrial demands plus a fire flow of five hours. Rule of thumb formulas indicate that Placentia should have approximately thirty million gallons of water in storage. Ul-

timately, storage capacity requirements will be between 45 and 50 million gallons. Currently, there are 1.75 million gallons of water in storage within the City limits.

Water Distributions System: Three classes of distribution mains in a large system are:

1. Primary feeders consisting of large pipes (minimum of 18 inches) with relatively wide spacing which convey large quantities to various points of the system for local distribution to the small mains.
2. Secondary feeders forming the network of pipes of intermediate size (minimum 12 inches) which reinforce the distributor grid within the various panels of the primary feeder system and aid the concentration of the required fire flow at any point.
3. Distributors consisting of a gridiron arrangement of small mains serving the individual fire hydrants and blocks of consumers. As a means of reliability, two or more primary feeders should run by separate routes from the source of supply across the City. Similarly, secondary feeders should be arranged as far as possible in loops so as to give two directions of supply to any point. This practice increases the capacity of the supply at any given point and assures



that a break in a feeder main will not completely cut off the supply. Secondary feeders should generally be installed in built-up areas not over 3,000 feet apart. Considerations of friction loss in pipes will govern this figure.

No pipe less than 6 inches in diameter is recommended for fire service and 6-inch pipes should only be used when they are looped in a gridiron. In high value districts, it is recommended that distributors should be not less than 8 inches and interconnected within every 600 feet. On principal streets and for all long lines, the distributors should be 12 inches or larger.

Currently, there are no primary or secondary feeders transversing the City of Placentia. The distribution system has been designed and constructed in accordance with good practices during the past 15 years; however, the older areas of the City, i.e., La Jolla, Old Town, and Atwood all have undersized lines of excessive length. This situation is being improved as new development and redevelopment occurs.

Cross connections, with valves that are kept normally closed, should be in place between the Water Systems serving Placentia and the surrounding jurisdictions.

Written agreements should be obtained whereby one jurisdiction will supply the other in an emergency.

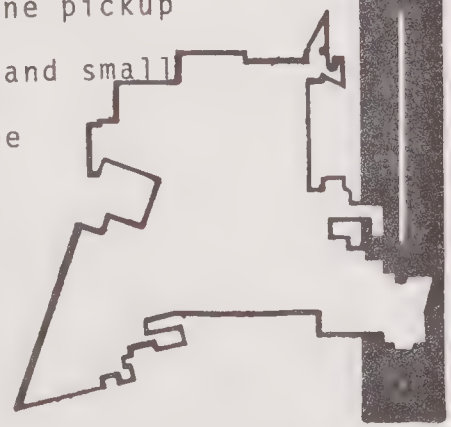
B. Fire Department: Placentia maintains two fire stations, the Bradford Station and the Valencia Station. The City is planning to relocate the Bradford Station to a more central location, thus providing better coverage and a more uniform response time throughout the entire City.

Facilities are being planned to provide in-depth training of fire department personnel by exposure to realistic fire and rescue problems.

A Boundary Dropping Agreement is in effect with the City of Brea. The City is also pursuing contractual arrangements with neighboring cities for specialized equipment such as providing truck service.

Equipment: The Fire Department normally operates two pumpers. Two other pumpers are maintained in reserve and for the Volunteer Force. One pickup truck is also in service and is being equipped with a water tank and small pump for use on minor emergencies. Fire Department pumpers can be considered reliable for a maximum of twenty years. The existing pumpers were constructed in 1969, 1964, 1958, and 1953.

Manpower: The Department has an authorized strength of 33 men with a minimum on duty manpower of six men. Level of service



with respect to manpower is determined by the City Council. City growth and fire protential should be reviewed periodically by the City Council with respect to manpower levels.

Training: Each man spends approximately 10 hours per week in an organized training program. A complete training facility is being planned with the Bradford Station relocation in order to fulfill the needs of a modern Fire Training Program.

C. Fire Service Communications: The City does not have a Municipal Fire Alarm System. Fires are reported by telephone or verbal contact. A cost benefit survey should be conducted -- insurance savings may override the cost of a fire alarm system.

Communications facilities between the Dispatch Center and Fire Units is adequate for day to day emergencies; however, it does not meet Insurance Standards. Insurance Standards require that the communication facilities be located in a bomb shelter and that there be an emergency backup system.

D. Fire Safety Control: The Fire Prevention Bureau works in close cooperation with other City Departments in regards to Fire Prevention Planning in new construction. The entire department

is involved in Fire Prevention Inspection Programs. Businesses are inspected annually. A public Education Program is conducted on a year-round basis and includes Home Safety Inspections, Junior Fireman Program, First Aid Classes, and various other Fire prevention Education Programs. Private Fire Protection devices such as sprinkler systems and early warning devices are encouraged by the Fire Department, however, current City codes limit the locations where they can be required.

Weed Abatement: The Fire Department administers the City-wide Weed Abatement Program. The program operates on an as-needed basis, usually two to three phases per year.

This program helps to prevent grass fires and keeps noxious weed growth from developing, thereby decreasing the chances of fire in the areas and creating a pleasing visual image of the City.

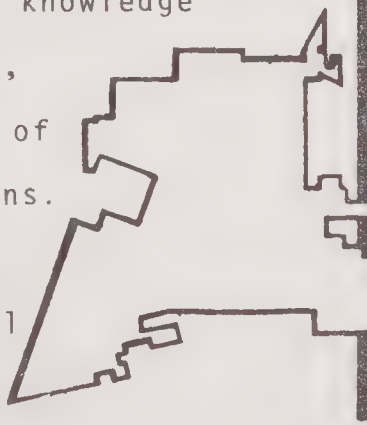
Geologic Hazards

As indicated in the Seismic Safety Element accompanying the present document, the geologic hazards investigated for this report may be divided into seismic and non-seismic categories. The specific hazards considered are listed and discussed in detail in the Background Data & Geotechnical Information Volume on file with the City. The most significant constraints are included here.

Ground Rupture Caused by Fault Movement: This hazard is considered low throughout the area except in those zones shown on the accompanying Land Use Capability Map (Plate II) indicating the projected tract of the Norwalk fault through the City. The danger of rupture is considered potentially moderate in these areas. It is stressed, however, that the evidence for the existence of these trace zones is preliminary at this time and that their actual existence has not been definitively demonstrated.

Seismic Shaking: Due to the location of Placentia with respect to the known active and potential active faults present in the Southern California area, as shown in Figure 1 of the Seismic Safety Element, the potential for ground shaking in the City is considered generally moderate. It is possible that due to specific local conditions within the city, localized intensity amplification effects may occur.

Expansive Soils and Settlement Hazards: Both of these geotechnical hazards are rated low to locally high within the city on the basis of present knowledge of the area. Expansive soils are known to be present in the city, although their impact can be minimized by detailed investigation of individual sites and utilization of compensating foundation designs. No major settlement problems have been encountered within the study area. Consequently, the recognition of settlement potential on individual lots and the incorporation of mitigation measures during construction is the primary response required.



Other Geologic Hazards: The potential for the occurrence of other geotechnical hazards is low in all cases. This is a result of the gentle topography of the area, the types of predominant geologic materials present, and the relative depth to the ground water table.

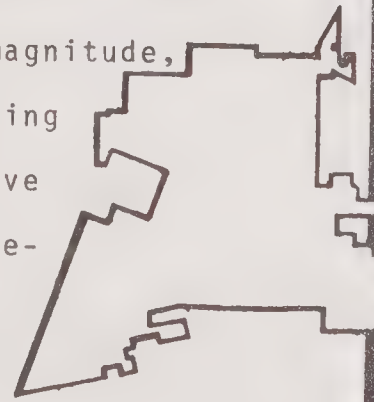
Flooding: The flood control projects are, in general, sufficient to handle the normal magnitude and spacing of winter storms and the usual spring runoff. As demonstrated by the recent heavy rains (December 3, 4, 1974), however, local flooding is a potential hazard in the Placentia area during periods of extreme climatic conditions. Portions of central and southcentral Placentia were temporarily flooded on December 4, causing traffic delay and limited property damage.

Additionally, although projection of the data provided in the 1971 report by the U.S. Army Corps of Engineers for the Orange County Flood Control District indicates flooding of the southern-most portions of Placentia is unlikely during the Standard Project Flood, such conditions could conceivably cause damage in Placentia as a result of the associated meteorological conditions. The Federal Insurance Administration of the Department of Housing and Urban Development has designated the southernmost portion of the City, below Orangethorpe Avenue, as Special Flood Hazard Areas, eligible for flood insurance. Innundation potential also exists from the north should seismic events or other phenomena cause breakage of the Carbon Canyon Dam or Anaheim Union Reservoir.

Floods may create health hazards due to the discharge of raw sewage from damaged sewer lines, septic tank leach fields, and sewage treatment plants. Critical public services may be disrupted. The costs of evacuation, relief, cleanup operations, and the repair of damaged facilities can be expensive. The burden of paying off the cost of Federal loans for re-construction of private property and of damage claims under Federally-subsidized flood insurance falls upon the general taxpayer in the aftermath of a disastrous flood. These latter considerations are somewhat extreme in nature and do not pose as large a potential hazard to the locality as other considerations in this document. They do, however, deserve evaluation in the overall General Plan for the City.

Other Hazards

Included here are occurrence such as explosions, major transportation accidents, chemical or nuclear events and criminal or wartime situations. Since such instances are difficult to predict in terms of timing and magnitude, cost-benefit considerations indicate the best method for minimizing the effects of these possible disasters is through a comprehensive disaster preparedness program. The Placentia Emergency Plan is reviewed in Appendix A of this report.



Fire Safety Recommendations

Fire Department:

1. A complete training facility should be developed in conjunction with the planning of the Bradford Station relocation.

2. Contractural arrangement for Fire Department Truck Service should be given high priority.

3. Fire Prevention inspections should be continued at an accelerated rate, if possible.

4. Although efforts are underway to upgrade older areas of the City, such as parts of La Jolla, Atwood, and Santa Fe, this program should be expedited in cooperation with other agencies.

5. More emphasis should be placed on private fire protection devices. Consideration should be given to requiring fire alarm devices for all buildings from 6,000 to 12,000 square feet and fire alarm devices and sprinkler systems in all buildings over 12,000 square feet.

6. The level of Fire Department manning should be reviewed periodically.

Water Supply Systems

1. Primary feeder lines should be constructed and/or completed on Placentia, Bradford, Kraemer, Rose Drive and Palm Drive.

2. Secondary feeder lines should be completed and/or installed on La Jolla, Orangethorpe, Chapman, Ruby, Alta Vista, Yorba Linda, Bastanchury, Golden, and Valencia.

3. The water distribution system should be replaced and/or installed as necessary in the Old Town area, La Jolla, and Atwood area.

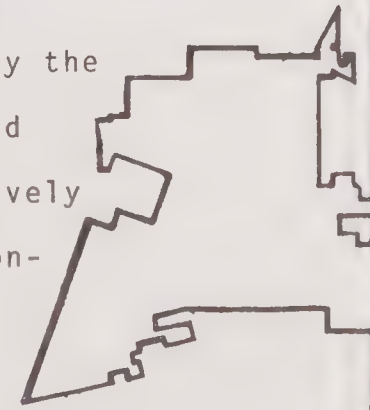
4. Three 15 million gallon reservoirs with emergency pumps should be constructed in the following areas - North Central, Atwood, and La Jolla.

5. Connections and normally closed valves should be installed interconnecting the Municipal Water Districts serving Placentia and the surrounding cities.

Geologic Occurrences

Given the present "state-of-the-art", seismic events occur without warning. Hence, reducing the hazard associated with such occurrences is accomplished by pre-planning and intelligent land-use based on knowledge of the geology and soils of an area. As indicated in the foregoing discussion, the primary hazards resulting from seismic activity in the Placentia region are strong ground motion and settlement potential. If the Norwalk fault does transect the area, surface rupture is also a potential phenomena; however, this is considered a secondary risk on the basis of present knowledge.

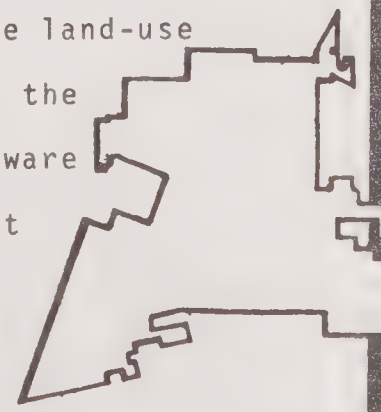
Strong ground motion and liquefaction effects may be minimized by the establishment of well-designed drainage, sediment compaction, and the use of pilings. For dwellings already completed, but relatively recent in age, awareness of the potential risk is the primary consideration. The latter factor is of the greatest importance in Placentia since most of the city has been developed previously. The present level of risk is well within the acceptable category,



considering the location of Placentia relative to the seismic activity level in California in general.

As the position and extent of the Norwalk fault becomes more clearly defined, its potential affect on Placentia will become more evident. Should it be proven to definitely transect the city, the potential for surface rupture will be obviously greater. Hence, the city should maintain cognizance of any future investigations into the position of this fault. Thus, new data as it is acquired can be utilized to update the Seismic Safety and Safety Elements, and the associated zoning regulations.

The other geologic hazards discussed in detail in the Seismic Safety Element include expansive soils, landslides, slumps, liquefaction, subsidence, and hydrocompaction. In the Placentia area, these geologic hazards will have their primary impact on individual property owners, as opposed to affecting major portions of the population as seismic activity may do. The land-use capability map indicates those areas of the community subject to the above hazards. Property owners in those areas need to be made aware of the potential hazards and, in those cases where possible, what kind of corrective action can be taken; i.e., the establishment of sufficient drainage plans, etc. For new development, the requirement for expansive soil tests, and other geologic



investigation will allow the developer to take these considerations into account when defining their development and construction plans. In general, these procedures will minimize the risk resulting from these non-seismic geologic hazards, placing them in the acceptable risk category in most instances.

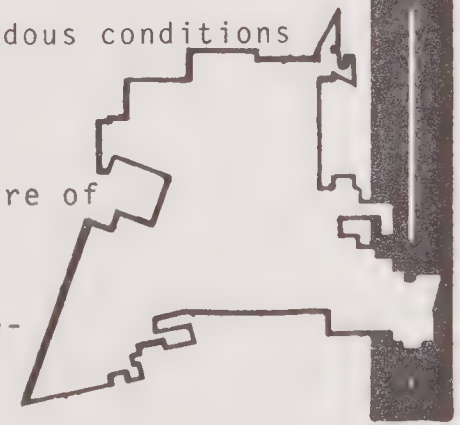
Flood Control

As indicated in the preceeding discussion on flooding, the primary flood hazard in Placentia develops when unusual rains occur in the area. A benefit-cost analysis of this situation may indicate that correcting this problem would be exceedingly costly due to its intermittent nature. At the same time, however, the general public should be made aware of the potential hazards that can result during periods of excessive precipitation.

LAND USE

General Considerations

The type of use to which a given land area is adapted is determined to a large degree by political and socio-economic factors. Particularly in the past, consideration of geologic, flood, and fire hazards has been minimal, non-existent, or after the fact; i.e., after development has taken place. From a safety standpoint, this approach has in many instances been disastrous in terms of loss of human life, social disruption, and economic loss. Hence, one of the primary functions of the General Plan and, specifically, the Seismic Safety and Safety Elements, is to ensure that sufficient pre-planning is accomplished to forego serious future losses. Secondarily, the elements serve to define those areas which have already been subject to development that may subsequently be subject to loss due to existing unsafe conditions. Thus, the land-use capability map submitted with this report serves to indicate those areas of Placentia in which hazardous or potentially hazardous conditions exist.



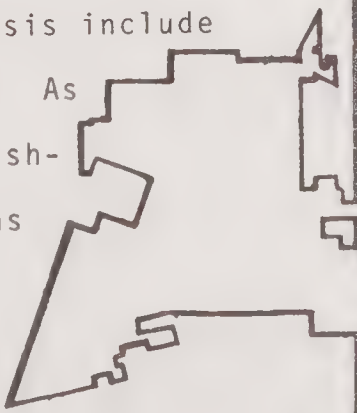
For the purpose of the Safety Element, land-use considerations are of particular importance with respect to the geologic and flooding constraints previously considered. Fire constraints are of somewhat lesser importance in defining land-use in the Placentia area since the city is already largely developed and includes

access roads with few areas of dense underbrush. Additionally, the natural causes of fires operational in the area are minimal.

Geologic Implications

The low to moderate potential for the majority of geotechnical hazards present within the city lowers the impact of these considerations on land-use. The primary area of concern at the moment is awareness on the part of the general public concerning the potential for ground shaking resulting from a major seismic event. Should the projected traces of the Norwalk fault be specifically defined within the city, and should the fault be specifically defined within the city, and should the fault at the same time be found to fall within the active category, the potential for surface rupture in the area will measurably increase. At the moment, however, these conditions have not been met and, therefore, have a low impact on land-use.

Secondary considerations affecting land-use on a more specific basis include the presence of expansive soils and the potential for settlement. As indicated previously, mitigation of these hazards may be accomplished in a reasonably straightforward manner utilizing proper designs and construction procedures.



Flood Areas

As previously indicated, the flood hazard potential for Placentia is extremely low. It is suggested, however, that individuals inhabiting the Carbon Canyon Creek area be made aware that failure of the associated dam could lead to a potentially disastrous situation in this area. Further, it is recommended that that portion of the Santa Ana River flood plain within Placentia not be utilized for continuously inhabited structures or for high density housing. Some consideration should also be given to modifying those areas of the city subject to local flooding during periods of excessive precipitation.

CONCLUSION

General Considerations

The present document in conjunction with the Seismic Safety Element, defines those areas of Placentia which for various reasons may be considered hazardous or potentially hazardous. These conclusions have been reached on the basis of presently available information both from third-party sources and, also, from the information provided by the city itself. The evaluations and determinations presented herein are based on the application of current theoretical and applied and scientific facts integrated with consideration of the social and economic factors applicable to the city and its inhabitants. Additionally, the report has been compiled to correspond with and satisfy the requirements for such documents as outlined in the general plan guidelines established by the State of California in 1973.

Impact on Other Documents

The present document should be utilized by the city to update or modify the zoning and grading regulations and the Emergency Plan. In addition, the document has a definite impact on the Land Use Element in that mitigation of specific geologic hazards may be required before the intended use of a land area may be achieved. Similarly, the present document may affect the Open Space Element

in that certain areas presently designated for other uses may be more appropriately declared open space areas due to the hazard considerations involved. The Circulation and Conservation Elements may also be affected, but potentially to a somewhat lesser degree. In the case of Placentia, the circulation patterns are largely established. Future modification of these patterns, however, will require consideration of the safety factors involved. In a similar fashion, conservation considerations may indicate preservation of a specific area is desirable, whereas safety considerations may indicate that modification is required and will probably, therefore, take precedence in arriving at the final decision.

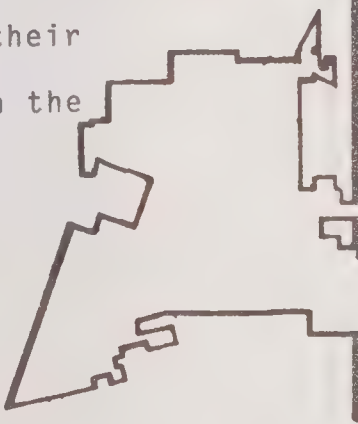
Future Considerations

In every instance where a general plan and its respective elements are prepared, it is recommended that the city or locality involved conceptulize them as viable documents rather than something to be published and then simply filed with no further consideration. The General Plan concept provides a real opportunity for development to occur in a fashion which will provide enjoyable and satisfying environments for area inhabitants while at the same time insuring that the growth will occur in an ordered and efficient fashion.

The Safety and Seismic Safety Elements are of particular impor-

tance in this regard in that they deal with areas where technological advances can change the impact of the considerations herein considerably. Consequently, it is imperative that some effort be made to insure that as information is acquired concerning our environment and its modification, the data be incorporated into the present document. For instance, present investigations into earthquake prediction may ultimately lead to a satisfactory monitoring system. Thus, the possibility exists that some areas which are currently considered undesirable for habitation may eventually become usable for such purposes under circumstances which are presently not feasible.

Societies and/or cultures are in themselves viable groups and demonstrate a certain fluidity in terms of their value systems and, therefore, the emphasis placed on land use and developmental considerations. Thus, irrelative of technological advances, the potential exists for changes in the premise on which a General Plan is based. Such a change would necessitate a reevaluation of the individual elements of the plan to insure their correlation with the changing value systems. Thus, to accomplish the task for which they are designed, it is necessary that they be utilized in their present form and modified when required.



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: is for general land-use planning only. Suitability for specific
a specific site must be confirmed by further investigation. An
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the use, if no other more suitable alternative sites are available,
ided that all potential hazards can be mitigated.

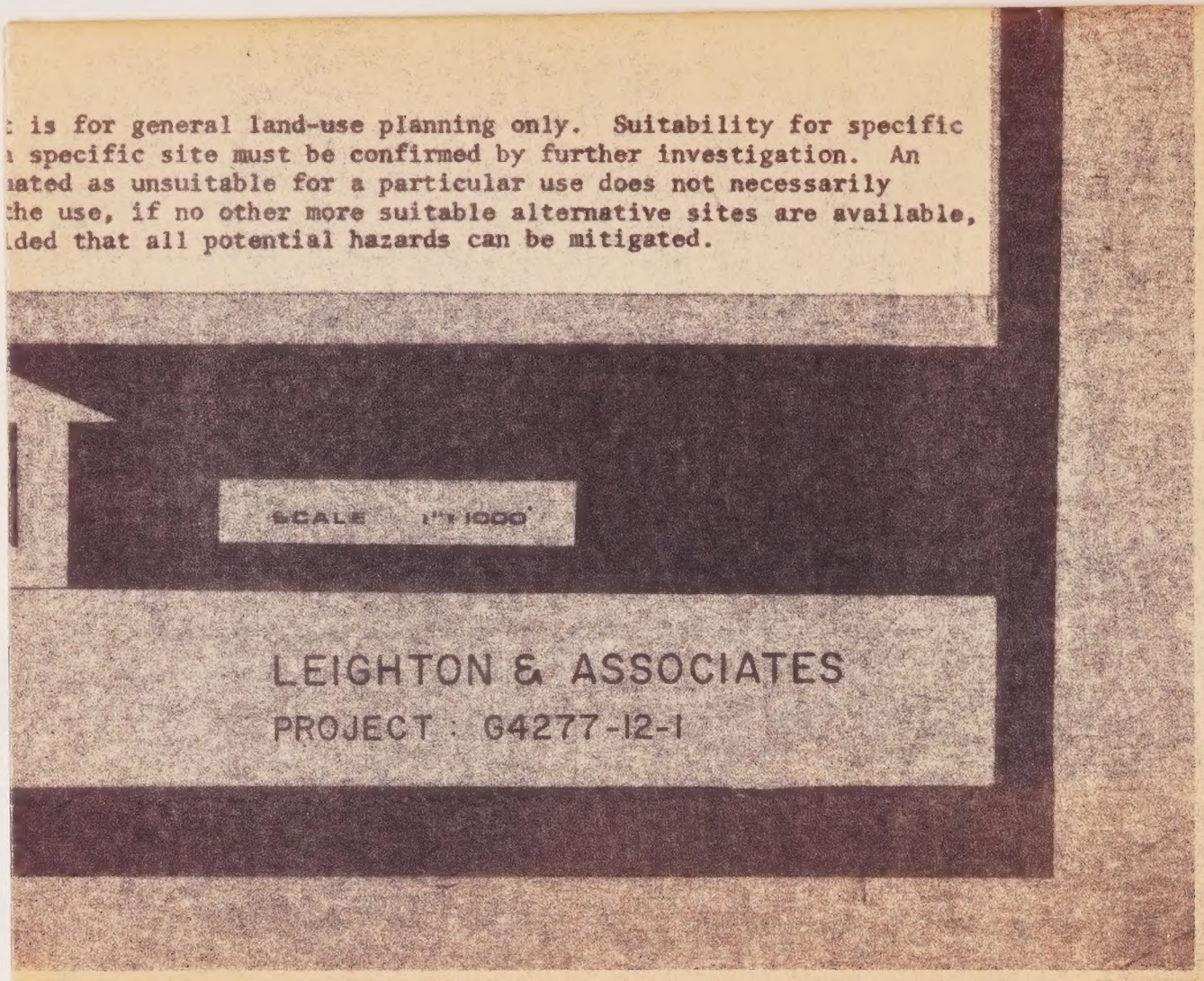

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PLATE II

LAND USE CAPABILITY MAP

PROBLEM LEVEL *	DEGREE OF PROBLEM	MAP SYMBOL	TYPE OF HAZARD	BUILDING TYPE/ LAND USES **	TYPE OF REPORT		
					GEOLOGIC	SOILS	SEISMIC
1	Few Problems	A	Ground Shaking	CRITICAL VITAL PUBLIC RESIDENTIAL INDUSTRIAL OPEN SPACE			X X
2	Problems Can Be Mitigated	B	Ground Shaking Expansive Soils	ALL GROUPS		X	
3.1	Problems Can Be Mitigated or Avoided	C	Ground Shaking Seiche, Expansive Soils	PUBLIC RESIDENTIAL INDUSTRIAL OPEN SPACE	X X X X	X X X X	X X X X
3.2		D	Ground Shaking Settlement Slope Failure				
3.3		E	Surface Rupture, Ground Shaking Expansive Soils				
4	Principal Problem Area	F	Surface Rupture, Ground Shaking, Expansive Soils	INDUSTRIAL OPEN SPACE	X X	X X	X X

* Problem level is assigned by considering all potential hazards in an area, their magnitude, and the environmental impact expected from the standpoint of personal, social and economic loss.

Note that certain areas assigned Problem Levels 3 & 4 are subject to the following extenuating considerations:
3.1: scheduled removal of existing water tank eliminates seiche problem and reduces problem level to 2.

3.3 & 4: Definition of the actual position and extension of the Norwalk fault in these areas has not been confirmed. Most likely trace based on aerial photo evidence (4) considered a principal problem unless fault trace is disproven, in which case problem level should be reassigned to level 2.

** GROUP

CRITICAL	Nuclear Facilities. Large Dams. Electrical Power Intertie Systems.
VITAL	Hospitals; Fire, Police, Emergency Communication Facilities; Critical Transportation Elements, such as Bridges, Overpasses, Smaller Dams, Important Utility Centers.
PUBLIC	Schools, Churches, Large or Highrise Buildings, or Other Places Normally Attracting Large Concentrations of People, such as Civic Buildings, Large Commercial Structures, Most Roads, Other Utilities.
RESIDENTIAL	Residential (Single-Family Residences, Apartments, etc.) Most Commercial and Minor Public Structures.
INDUSTRIAL	Most Industrial, Other Minor Commercial (Warehouses).
OPEN SPACE	Agriculture, Golf Courses, Managed Mineral Resource Development, Parks, Other Open Space, Refuse Disposal Sites.

NOTE

This chart is for general land-use planning only. Suitability for specific uses for a specific site must be confirmed by further investigation. An area evaluated as unsuitable for a particular use does not necessarily preclude the use, if no other more suitable alternative sites are available, and, provided that all potential hazards can be mitigated.

PLACENTIA

N

SCALE 1"=1000'

LEIGHTON & ASSOCIATES
PROJECT G4277-12-1